**Topic**: Surface area to volume ratio of prisms

**Question**: Calculate the surface area to volume ratio.

Calculate the surface area to volume ratio of a right rectangular prism that measures $2$ cm high, $3$ cm wide, and $5$ cm long. Express your answer as a decimal to the nearest tenth.

**Answer choices**:

A $2.1$

B $2.6$

C $3.5$

D $3.8$

© Krista King Math

**Solution**: A

Use

$$S = 2lw + 2hw + 2lh$$

to find the surface area.

$$S = 2 \cdot 5 \cdot 3 + 2 \cdot 2 \cdot 3 + 2 \cdot 5 \cdot 2$$

$$S = 62$$

Use $V = lwh$ to find the volume.

$$V = 5 \cdot 3 \cdot 2$$

$$V = 30$$

Now it's easy to find the ratio.

$$\frac{S}{V} = \frac{62}{30} = \frac{31}{15}$$

As a decimal to the nearest tenth, that would be $2.1$.

© Krista King Math

**Topic**: Surface area to volume ratio of prisms

**Question**: Calculate the surface area to volume ratio.

Calculate the surface area to volume ratio of a cube that is $1$ by $1$ by $1$. Then calculate the same ratio for a $2$ by $2$ by $2$ cube. What happened to the ratio when you doubled the length of each side? The ratio...

**Answer choices**:

A stayed the same.

B doubled.

C quadrupled.

D was cut in half.

© Krista King Math

**Solution**: D

Use

$$S = 2lw + 2hw + 2lh$$

to find the surface area and $V = lwh$ to find the volume.

The small cube:

$$S = (2 \cdot 1 \cdot 1) + (2 \cdot 1 \cdot 1) + (2 \cdot 1 \cdot 1) = 6$$

$$V = 1 \cdot 1 \cdot 1 = 1$$

The ratio is

$$\frac{6}{1} = 6$$

The large cube:

$$S = (2 \cdot 2 \cdot 2) + (2 \cdot 2 \cdot 2) + (2 \cdot 2 \cdot 2) = 24$$

$$V = 2 \cdot 2 \cdot 2 = 8$$

The ratio is

$$\frac{24}{8} = \frac{3}{1}$$

Comparing these, we can see that the ratio has been cut in half, from $6/1$ to $3/1$.

© Krista King Math

Surprisingly, the same thing happens when you double the size of any object, no matter the shape or initial size.

© Krista King Math

**Topic**: Surface area to volume ratio of prisms

**Question**: Calculate the surface area to volume ratio.

A right rectangular prism has dimensions $x$ by $x$ by $2x$.

**Answer choices**:

A $\frac{5}{x}$

B $\frac{5}{1}$

C $\frac{4x}{1}$

D $\frac{1}{10x}$

© Krista King Math

**Solution**: A

Use

$$S = 2lw + 2hw + 2lh$$

to find the surface area.

$$S = (2 \cdot 2x \cdot x) + (2 \cdot x \cdot x) + (2 \cdot 2x \cdot x) = 10x^2$$

For volume, we get

$$V = lwh$$

$$V = 2x \cdot x \cdot x = 2x^3$$

The ratio is

$$\frac{10x^2}{2x^3} = \frac{2x^2}{2x^2} \cdot \frac{5}{x} = \frac{5}{x}$$

© Krista King Math